

Remarks

Claims 1-16 and 18 stand rejected under 35 U.S.C. 103(a) in view of U.S. Patent Number 5,310,854 ("Heinmeyer I") and U.S. Patent Number 4,732,958 ("Jackson").

In one aspect, the presently claimed invention is directed to a process for making an advanced epoxy resin in an extruder. This process has a higher throughput than conventional extrusion processes, and does not require large amounts of solvent like a conventional batch fusion process. In the presently claimed process the extruder is operated at a temperature greater than 200°C, and at least one iminium salt catalyst is used.

Heinmeyer I is directed to a resin composition and a process for making the resin composition in an extruder. The working examples in Heinmeyer I maintain the melt in the extruder below 200°C, and the materials had an average residence time in the extruder of 2.5 – 3.5 minutes. Heinmeyer I fails to teach or suggest the use of an iminium salt catalyst.¹

Jackson is directed to a fusion reaction process for preparing a resin, and this reference teaches that an iminium salt catalyst may be used in such a process. In the batch fusion reaction process of Jackson, a polyepoxide, fusion compound reactants, and catalyst are added to a reaction vessel and allowed to react. The exotherm for the reaction is held between 160° - 200°C, for a time of 1–2 hours.

Neither Heinmeyer I nor Jackson teach, disclose, or suggest the use of an iminium salt catalyst in an extrusion process. It is contended that it would be obvious to employ the catalyst in batch fusion process of Jackson in the extrusion process of Heinmeyer I to provide the presently claimed invention. However, the reaction conditions in the batch fusion process are very different from the reaction conditions in the extrusion process. For example, the time required to use an iminium salt catalyst in Jackson for the fusion reaction is 17-48 times as long as the average residence time in the extruder of Heinmeyer I. In addition to the dramatic time difference in which the reaction must occur, there is less time and space in the extruder to ensure

¹ The catalysts in Heinmeyer I do not include the iminium salts taught by Jackson, even though Jackson issued 17 months before the application of Heinmeyer I was filed.

thorough mixing, and if the reaction proceeds too far, the materials will gell or set in the extruder.

Applicants respectfully submit that there is nothing in the teachings of Jackson that would suggest to a skilled artisan that the catalysts in the batch fusion process in Jackson would be useful in the extruder employed in the process described in the Heinmeyer I reference. In view of the significant differences in process conditions noted above, it is respectfully submitted that the obviousness rejection based on the combined teachings of Jackson and Heinmeyer I is the result of hindsight following review of the present disclosure, and is improper.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claim 17 stands rejected under 35 U.S.C 103(a) in view of Heinmeyer I, Jackson, and U.S. Patent Number 4,612,156 ("Heinmeyer II").

As discussed above, based on the teachings of Jackson, one of ordinary skill would not be motivated to use Jackson's iminium salt catalyst in an extrusion process. Heinmeyer II, like Heinmeyer I, is directed towards an extrusion process and likewise does not teach, disclose or suggest the use on iminium salt catalyst. Furthermore, Jackson teaches deactivation of the catalyst through the use of an acid or sulfonium salt of an acid containing an anion of low nucleophilicity, such as HBF_4 , $\text{CF}_3\text{SO}_3\text{H}$, etc. rather than the use of a chain terminator. Therefore, one following Jackson and using an iminium salt catalyst would be motivated to use an anion with low nucleophilicity, rather than a chain terminator.

For at least these reasons, Applicants respectfully submit that claim 17 is not obvious over the combined teachings of Heinmeyer I, Heinmeyer II and Jackson. Reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above, Applicants respectfully request withdrawal of the obviousness rejections and allowance of all claims at an early date. If questions remain regarding the above, please contact the undersigned.

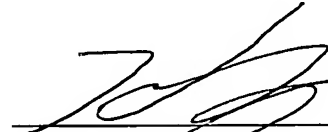
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Enclosed is a \$950.00 check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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